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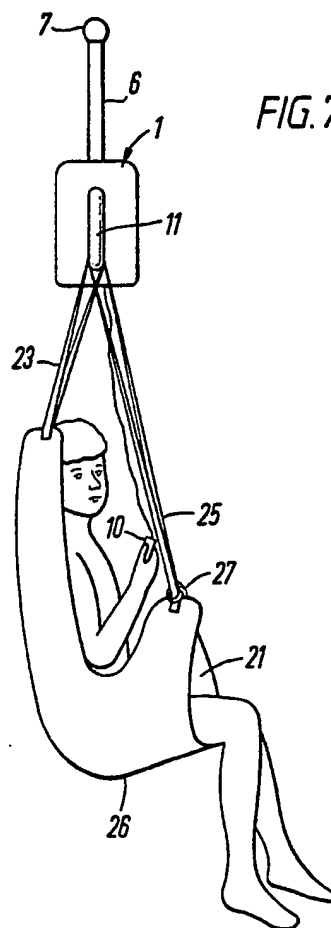
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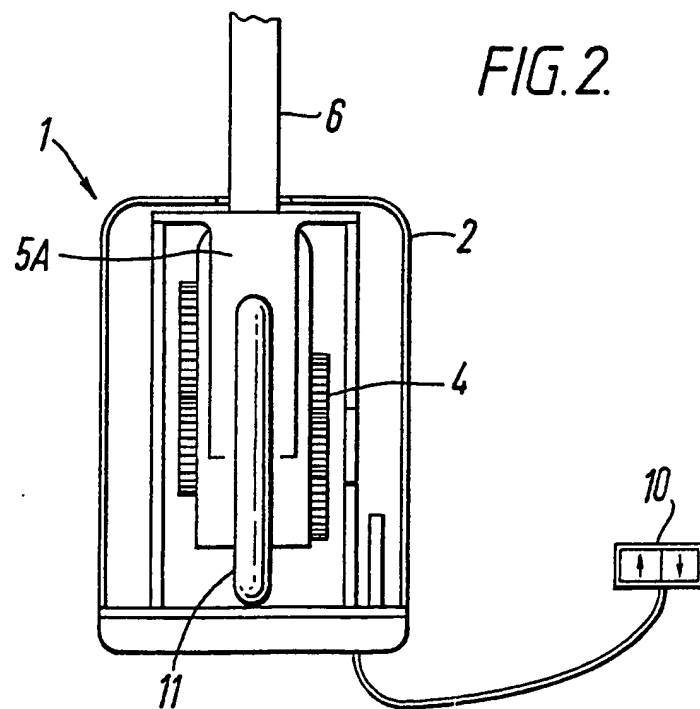
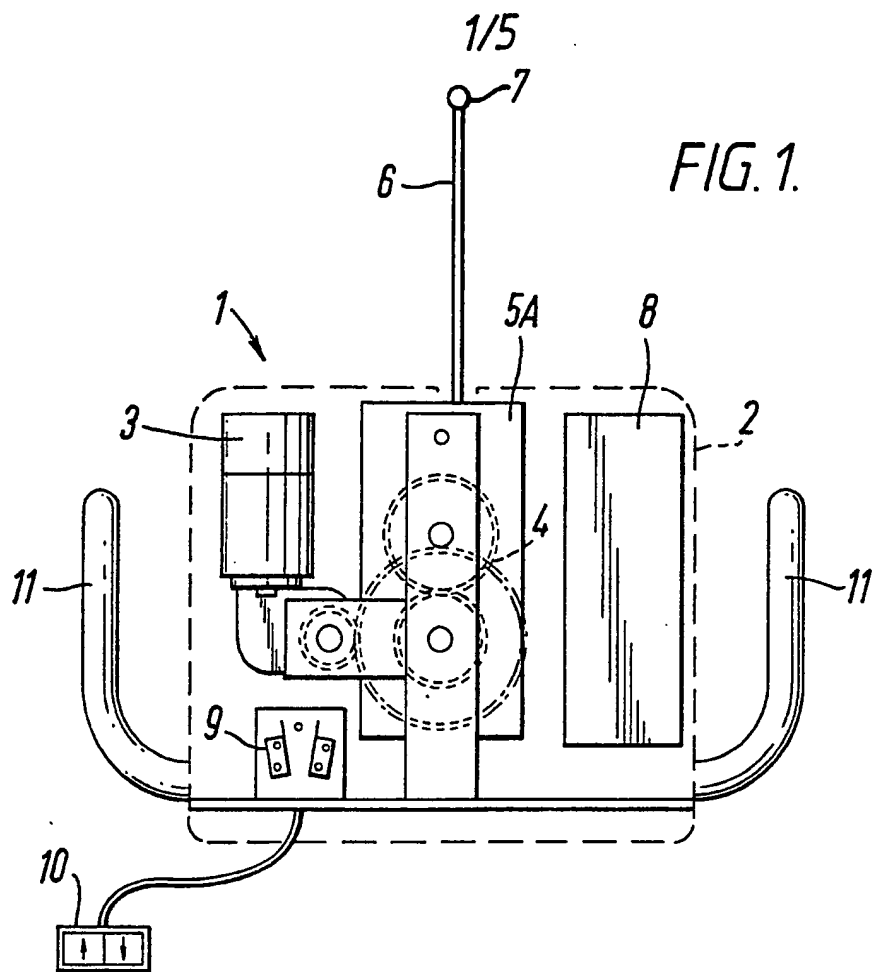
(56) Documents cited
GB 1092926 A GB 0789468 A US 4125908 A

(58) Field of search
UK CL (Edition K) **B8B BA BBC BDM BED BEG**
BEK BEU BEW
INT CL⁵ **A61G**

(54) Portable lifting apparatus

(57) A portable lifting apparatus (1) for raising and lowering a patient comprises a lifting device and a harness (20). The lifting device comprises a housing which encloses a winch mechanism, an associated power plant, and remote control means (10). Hook means (11) are mounted on the housing and a belt (6) extends through the housing having one end secured to a spool of said winch mechanism and its other end attached to a support which is to be positioned vertically above said winch mechanism when the apparatus (1) is used. The harness (20) is provided with a plurality of looped straps (23, 25) arranged to hook over said hook means (11). The housing (1) is above the patient and the straps (23, 25) are looped over said hook means when the apparatus (1) is used to lift the patient and activation of said remote control (10) means effects lifting of the patient.





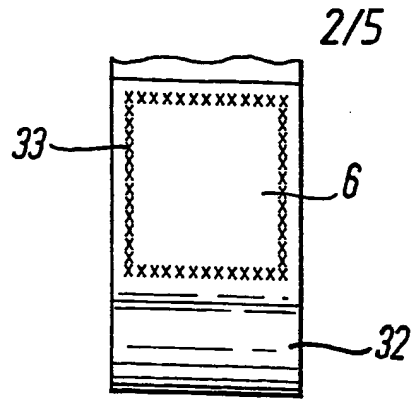
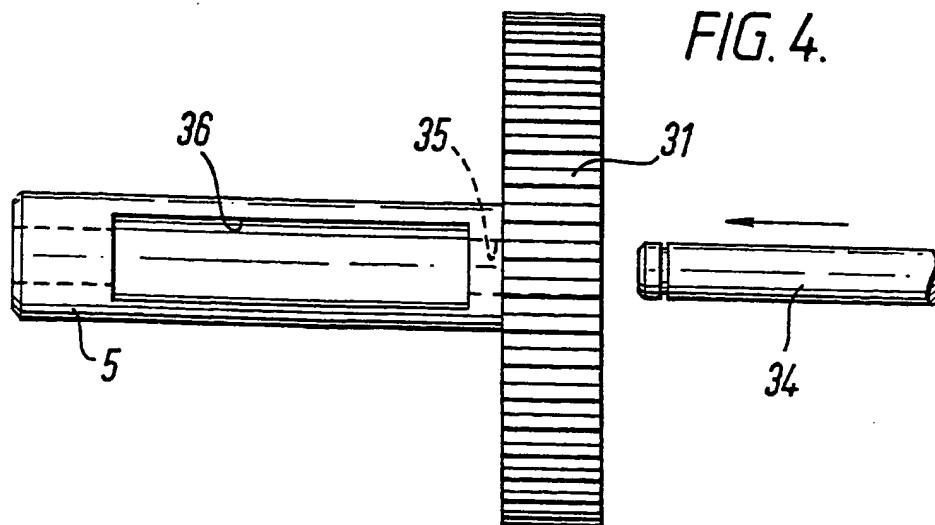
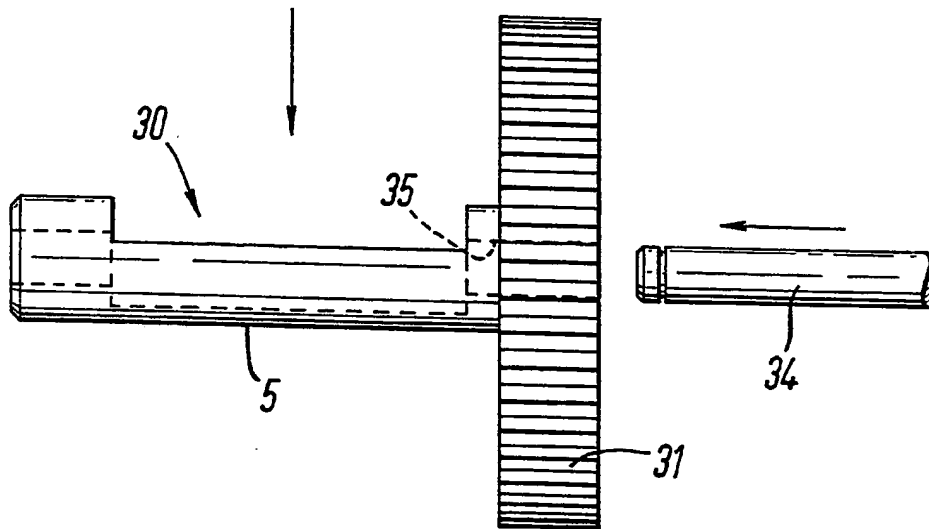


FIG. 3.



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FIG. 5.

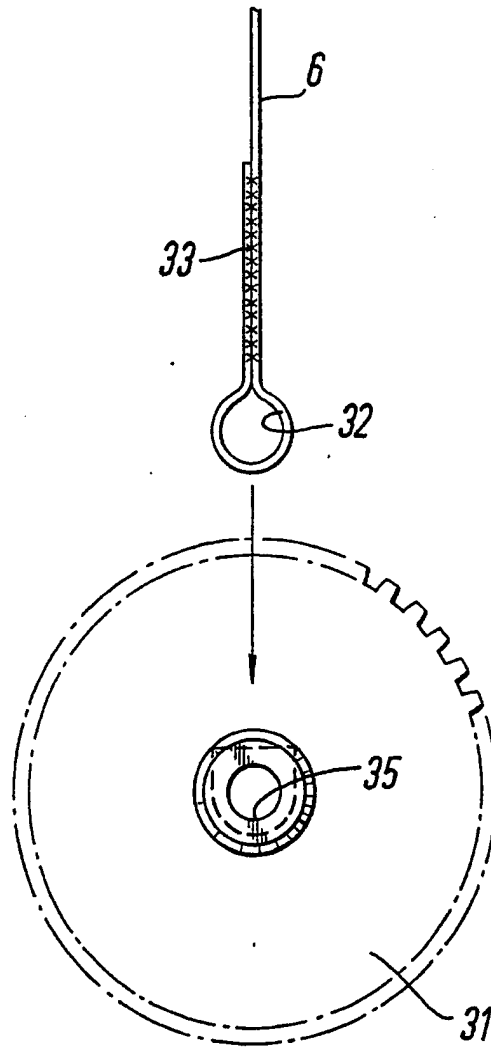
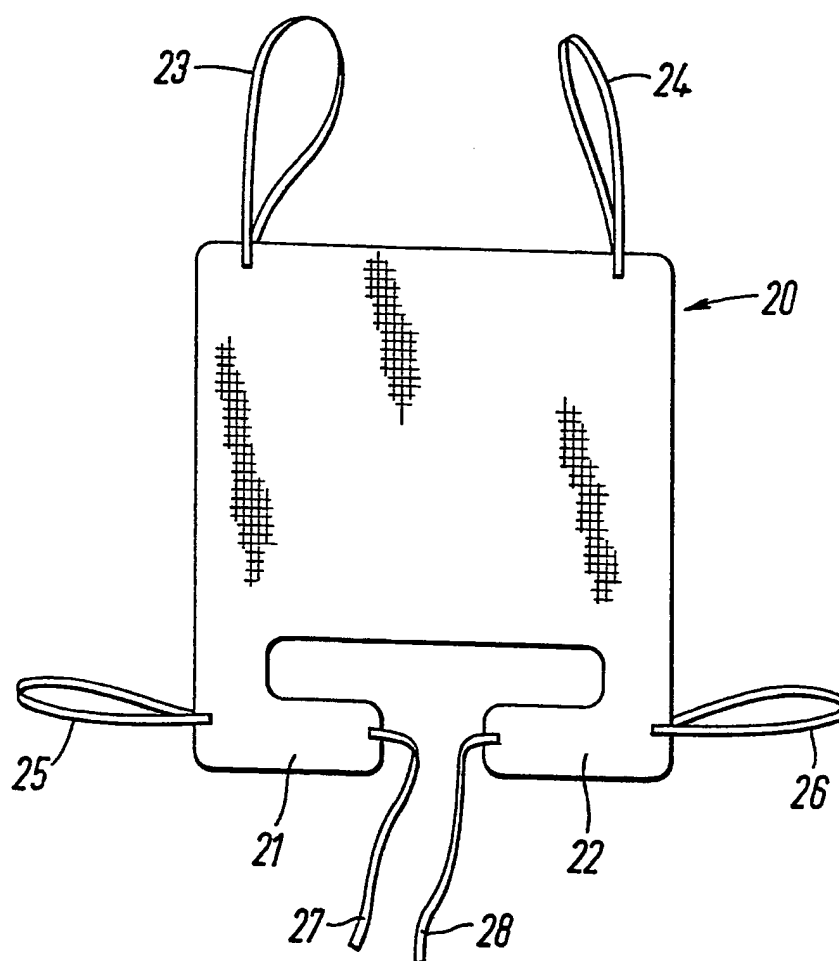


FIG. 6.



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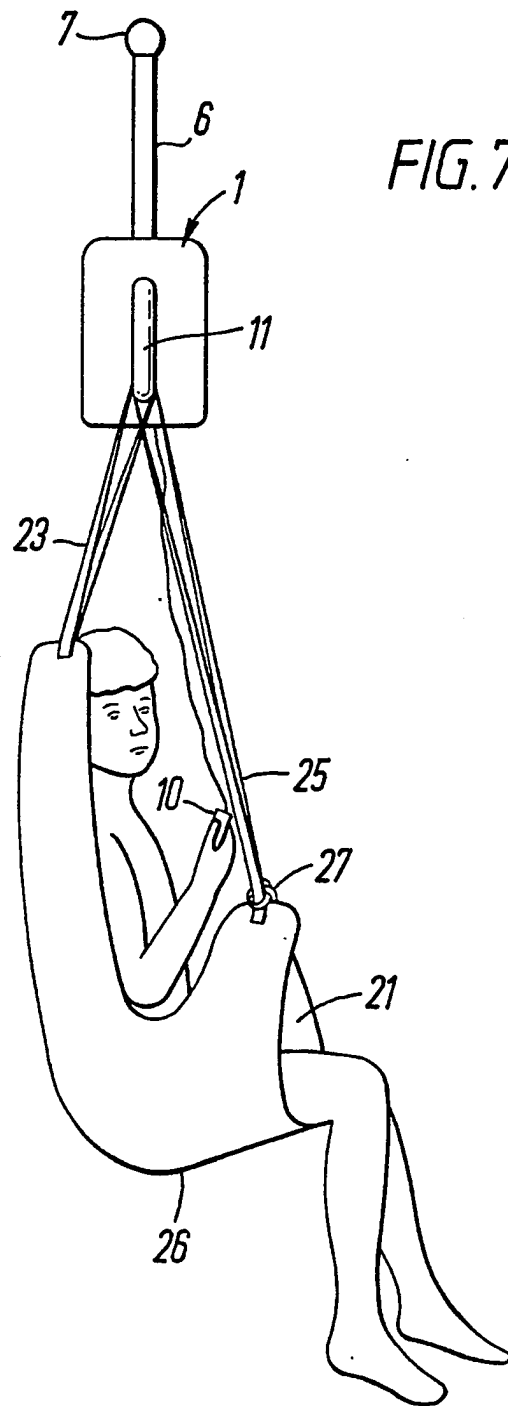


FIG. 7.

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DESCRIPTION

PORTABLE LIFTING APPARATUS

5 The present invention relates to a portable lifting apparatus. More particularly it relates to a portable lifting apparatus for raising and lowering a patient, for example an invalid or a disabled person.

10 This type of apparatus is required for lifting patients so that they can be transported from one place to another, for example from a wheelchair to a bed or vice versa. One such device is disclosed in U.S. Patent No. 4805248. This patent discloses a lifting apparatus comprising a frame with a motor, gear means and a winch drum having a belt wound
15 thereon and mounted on the frame. The frame is generally rectangular and has suspension points at each of its four corners. A harness is also provided which has a plurality of attachment points arranged to
20 be secured to respective suspension points so as to provide a seat and back support for a patient. Hand grips are mounted on the frame and adjacent to these are means to activate the motor and gear means by either the patient or an attendant. In use the device

is disposed adjacent to a patient who is to be lifted and who is seated upon the harness. Two of the corners of the frame are above the other two. The attachment points of the harness are secured to their
5 respective suspension points whilst the patient is sitting on the harness. The patient holds onto the hand grips and is lifted by operation of the activating means by either himself or an attendant.

10 Once the apparatus has been put into operation a problem arises in that the centre of gravity of the combined patient and apparatus is not in a line directly below the point of contact of the belt with an overhead support. Thus once a patient is lifted, he
15 will tend to swing together with the apparatus. This swinging motion will continue until equilibrium is reached.

According to the present invention there is provided a
20 portable lifting apparatus for raising and lowering a patient comprising a lifting device and a harness, said lifting device comprising a housing which encloses a winch mechanism and associated power plant, said lifting device further including remote control

means to activate said winch mechanism, hook means
mounted on said housing and a belt extending through
the housing and having one end secured to a spool of
said winch mechanism and its other end attached to a
5 support which is to be positioned vertically above
said winch mechanism when the apparatus is used, said
harness being arranged to receive the patient in a
sitting position and being provided with a plurality
of looped straps arranged to hook over said hook
10 means, wherein said housing is above the patient and
said straps are looped over said hook means when the
apparatus is used to lift the patient and whereupon
activation of said remote control means effects
lifting of the patient without substantial horizontal
15 oscillations.

A specific embodiment of the invention will now be
described by way of example only with reference to the
20 accompanying drawings. In the drawings:-

Figure 1 is a front view of a lifting device with part
of its housing shown dotted to reveal apparatus housed
therein;

Figure 2 is a side view of the lifting device shown in Figure 1 with a side wall of the housing removed;

5 Figure 3 is a side view of part of a winch mechanism of the lifting device shown in Figure 1;

Figure 4 is a plan view of part of the winch mechanism shown in Figure 3;

10 Figure 5 is an end view of a spool, a gear and pin of the winch mechanism shown in Figures 3 and 4 with the belt shown separated from the spool;

15 Figure 6 is a plan view of a harness for use with the lifting device shown in Figures 1 and 2;

Figure 7 is a side view of the lifting apparatus comprising the harness of Figure 3 suspended from the lifting device of Figures 1 and 2;

20 Figure 1 shows a lifting device 1 comprising a housing 2 which is generally rectangular in cross-section and which is shown dotted to reveal apparatus inside it. Mounted in the housing 2 is an electric motor 3 which

drives a winch spool of a winch mechanism through a gear train 4. The winch spool is enclosed within its own housing 5A. One end of a belt 6 is secured to the winch spool. The other end of the belt 6 is attached
5 to an overhead support 7 on a track (not shown). A battery pack 8 is mounted in the housing 2 and provides power to the motor 3. The speed and direction of motion of the lifting device 1 are determined by the setting of switching means 9
10 provided within the housing 2. The switching means 9 comprise air actuated switches but may be of any other suitable type. Remote control means 10 are provided to actuate the switching means. Two hooked projections
15 11 extend from opposite sides of the housing 2 on which they are mounted symmetrically.

Figures 3, 4 and 5 show part of the winch mechanism. The winch spool 5 is in the form of a cylinder having an axial bore 36 with a portion of its wall cut away
20 at 30 to expose a section of the bore 36. The spool 5 is secured at one end to a gear 31 of the gear train 4. The belt 6 is folded back on itself at one end to define a loop 32, with the juxtaposed portions of the belt being secured to each other by stitching 33 or

any other suitable means. The loop 32 of the belt 6 is arranged to fit into the cut away portion 30 of spool 5 whereupon a pin 34 is pushed through a central opening 35 in the gear 31, into the bore 36 of the spool 5 and through the loop 32 which has been placed in the cut away portion 30 of the spool 5. Once in position the pin 34 is encompassed at its ends by the spool 5 and along its middle portion by the loop 32 of belt 6. When the gear train 4 is driven by the motor 3, the belt 6 winds around the spool 5 thereby facilitating lifting of the device 1.

Figure 6 shows a generally rectangular harness 20 which is cut away at one end to form a T-shaped bight and support portions 21 and 22. The harness 20 is provided with four adjustable looped straps 23, 24, 25, 26, one at each corner, and two straps 27, 28, each attached to a respective one of the support portions 21, 22. Loops 23 and 25 are arranged to be hooked over the projection 11 on one side of the housing 2 and loops 22 and 24 are arranged to be hooked over the projection 11 on the opposite side of the housing 2. Strap 27 is looped around strap 25 and secured to itself by suitable means thereby enabling

support portion 21 to support a leg of the patient. Strap 28 is looped around strap 26 and secured to itself in a similar manner to that of strap 27, thereby enabling support portion 22 to support the patient's other leg. The length of the harness is such that the patient's head is supported by the end portion of the harness between the loops 23 and 24.

In order to use the apparatus the patient is seated upon the harness 20 and the lifting device 1 is located directly above him. The device 1 is lowered by operating the remote control means 10 to facilitate the hooking of straps 23, 24, 25 and 26 to their respective projections 11. Straps 27 and 28 are looped around straps 25 and 26 respectively and secured to themselves by suitable means. The patient is now securely held within the harness and the lifting device can be operated by the patient or an attendant to lift the patient using the remote control means.

As the patient is directly below the lifting device 1, which in turn is directly below the overhead support 7, the patient may be lifted vertically without being

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subjected to horizontal oscillations. Once in a raised position the patient can be transported horizontally by means of the track to a desired position and then lowered as required.

CLAIMS

1. A portable lifting apparatus for raising and lowering a patient comprising a lifting device and a harness, said lifting device comprising a housing
5 which encloses a winch mechanism and associated power plant, said lifting device further including remote control means to activate said winch mechanism, hook means mounted on said housing and a belt extending
10 through the housing and having one end secured to a spool of said winch mechanism and its other end attached to a support which is to be positioned vertically above said winch mechanism when the apparatus is used, said harness being arranged to
15 receive the patient in a sitting position and being provided with a plurality of looped straps arranged to hook over said hook means, wherein said housing is above the patient and said straps are looped over said hook means when the apparatus is used to lift the
20 patient and whereupon activation of said remote control means effects lifting of the patient without substantial horizontal oscillations.

2. A portable lifting apparatus as claimed in claim
1, said spool having an axial bore therethrough and
having a portion of its wall cut away to expose a
section of its bore, and said belt having a loop at
5 one end, wherein the loop of said belt is received
within the cut away portion of said spool and a pin is
inserted into the bore of said spool and through the
loop of said belt, said belt being wound around said
spool upon activation of said winch mechanism.

10

3. Apparatus for securing a belt to a spool of a
winch mechanism comprising,

a belt looped at one end;

a spool having an axial bore and having a portion
15 of its wall cut away to expose a section of its
bore;

a pin which is to be received within the bore of
said spool, wherein the loop of said belt is received
within the cut away portion of said spool and said pin
20 is inserted into the bore of said spool and through
the loop of said belt.

4. Method of securing a belt to a spool of a winch mechanism using the apparatus of claim 3, said method comprising the steps of;

5 inserting the loop of said belt into the cut away portion of said spool;

 inserting the pin into the bore of said spool and through the loop of said belt.

Patents Act 1977

**Examiner's report to the Comptroller under
Section 17 (The Search Report)**

Application number

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Relevant Technical fields

(i) UK CI (Edition K) B8B - BEU, BEG, BEK, BDH, BA,
BBC, BEW, BED

(ii) Int CI (Edition 5) A61G

Search Examiner

B J THOMAS

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search

12 DECEMBER 1991

Documents considered relevant following a search in respect of claims 1, 2

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
Y	GB 1092926 (RAILVALIFT) see Figure 1	1
Y	GB 789468 (WATSON) see Figure 1	1
Y	US 4125908 (VAIL) see Figure 1	1

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

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E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

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